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Choi et al.

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(54) **TOILET FLUSHING DEVICE USING TOILET COVER**

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E03D 1/34 (2006.01)

(52) **U.S. Cl.**
CPC ***E03D 5/04*** (2013.01); ***E03D 1/34*** (2013.01)

(58) **Field of Classification Search**
CPC E03D 5/02; E03D 5/04; E03D 1/34
See application file for complete search history.

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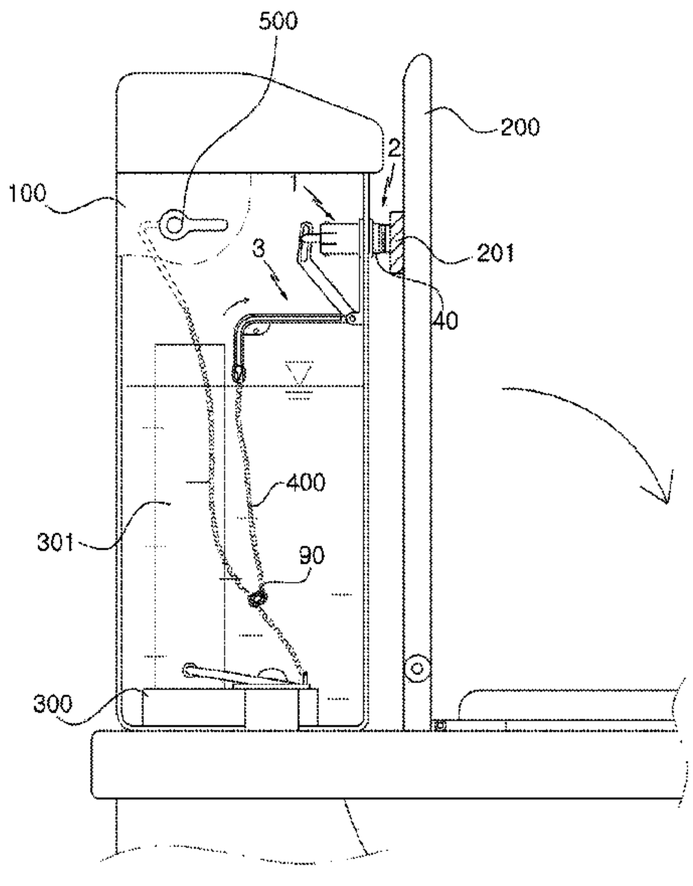
(57) **ABSTRACT**

The present invention relates to a toilet flushing device using a toilet cover. More specifically, the present invention comprises: a sliding means disposed at the front side of a water tank and configured to slide forward/backward by magnetic force to allow a drain valve to operate as soon as a toilet cover is closed; and an operation lever disposed at the rear side of the sliding means so as to open or close the drain valve, wherein the drain valve is operated to flush water by a structure in which the sliding means and the operation lever operate in cooperation in response to an operation of the toilet cover after use of the toilet. Therefore, the present invention can induce the habit of covering the toilet by the toilet cover after using the toilet and thus enhance a sanitary culture.

6 Claims, 10 Drawing Sheets



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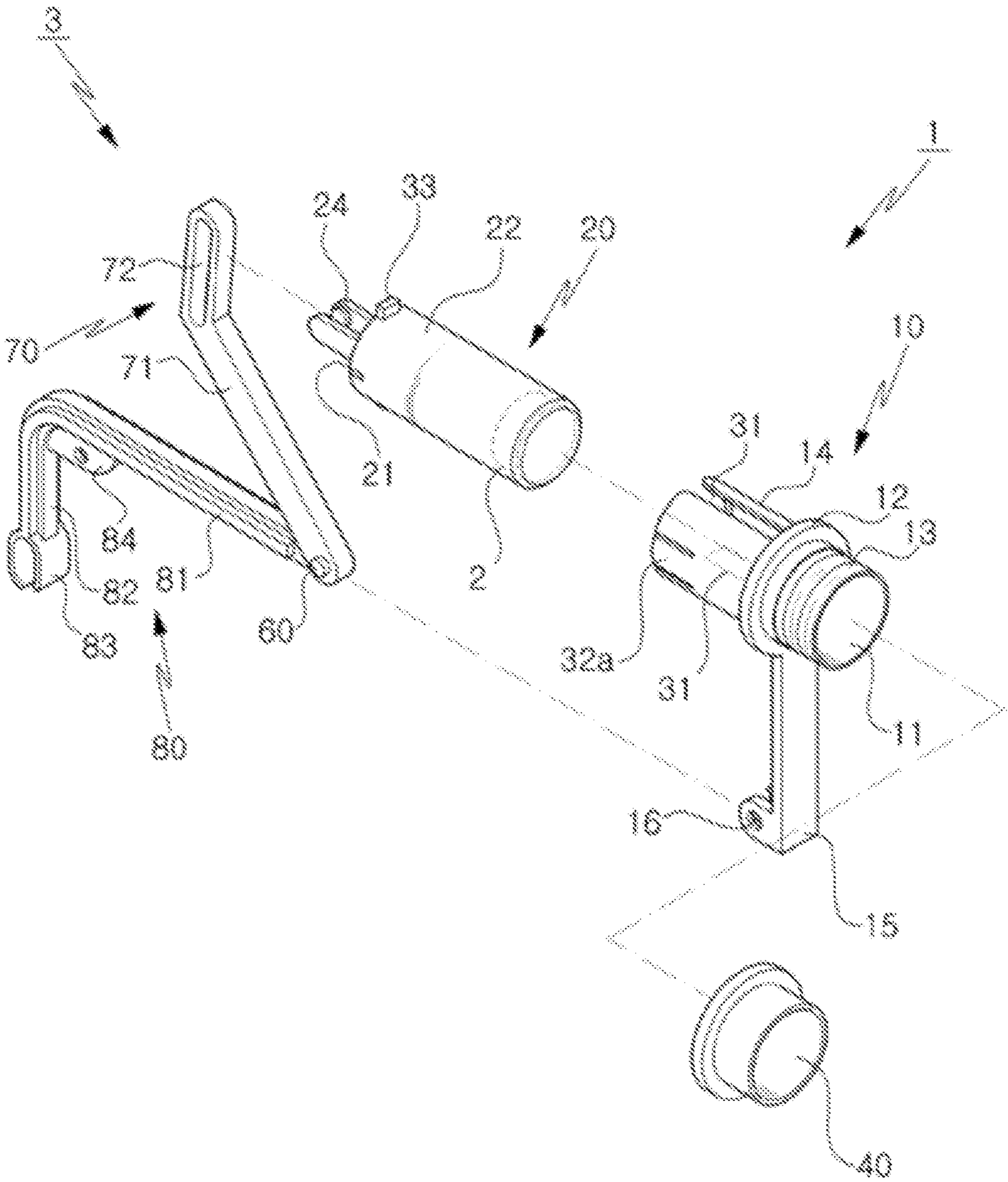
[FIG. 1]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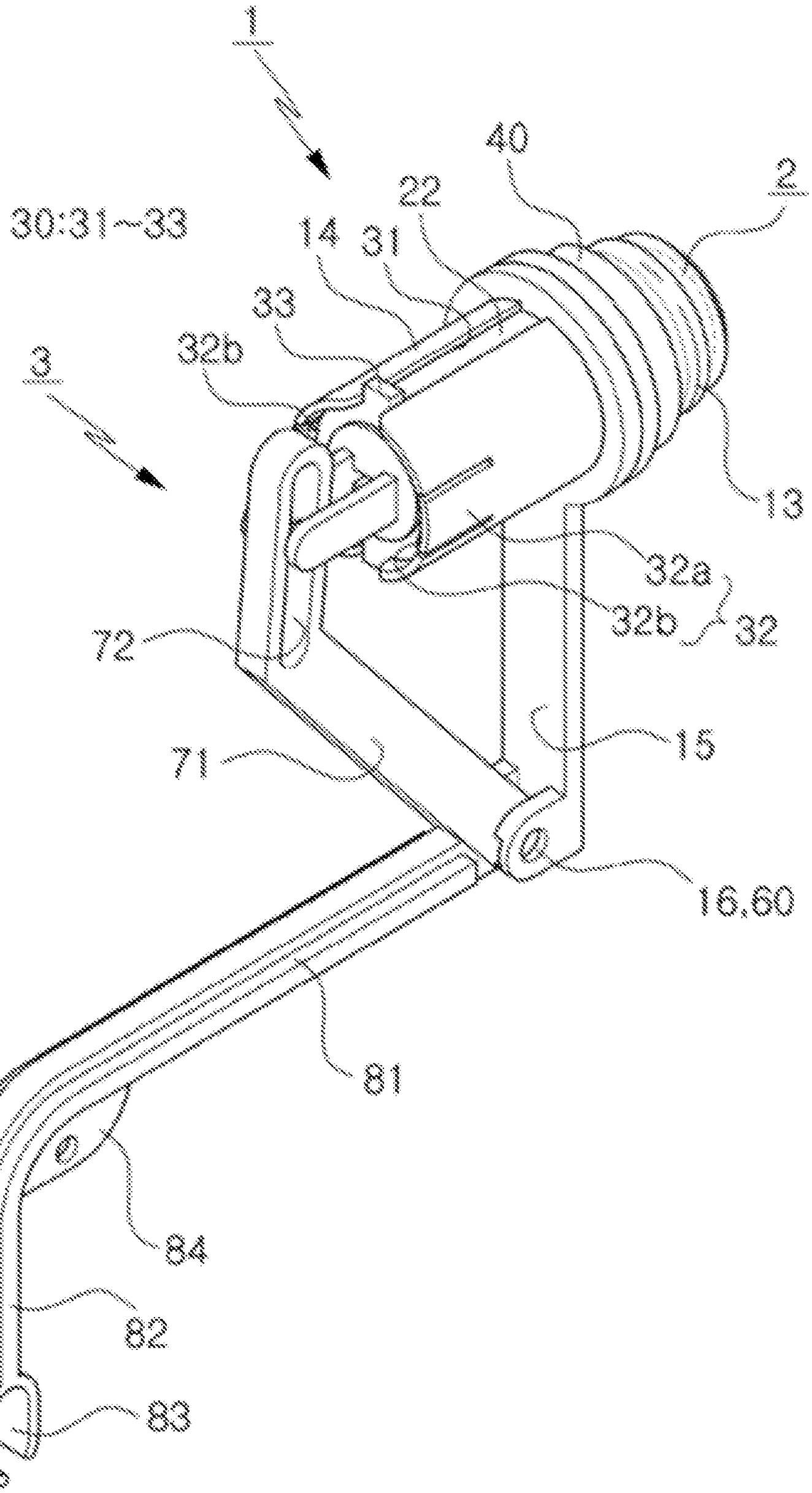
[FIG. 2]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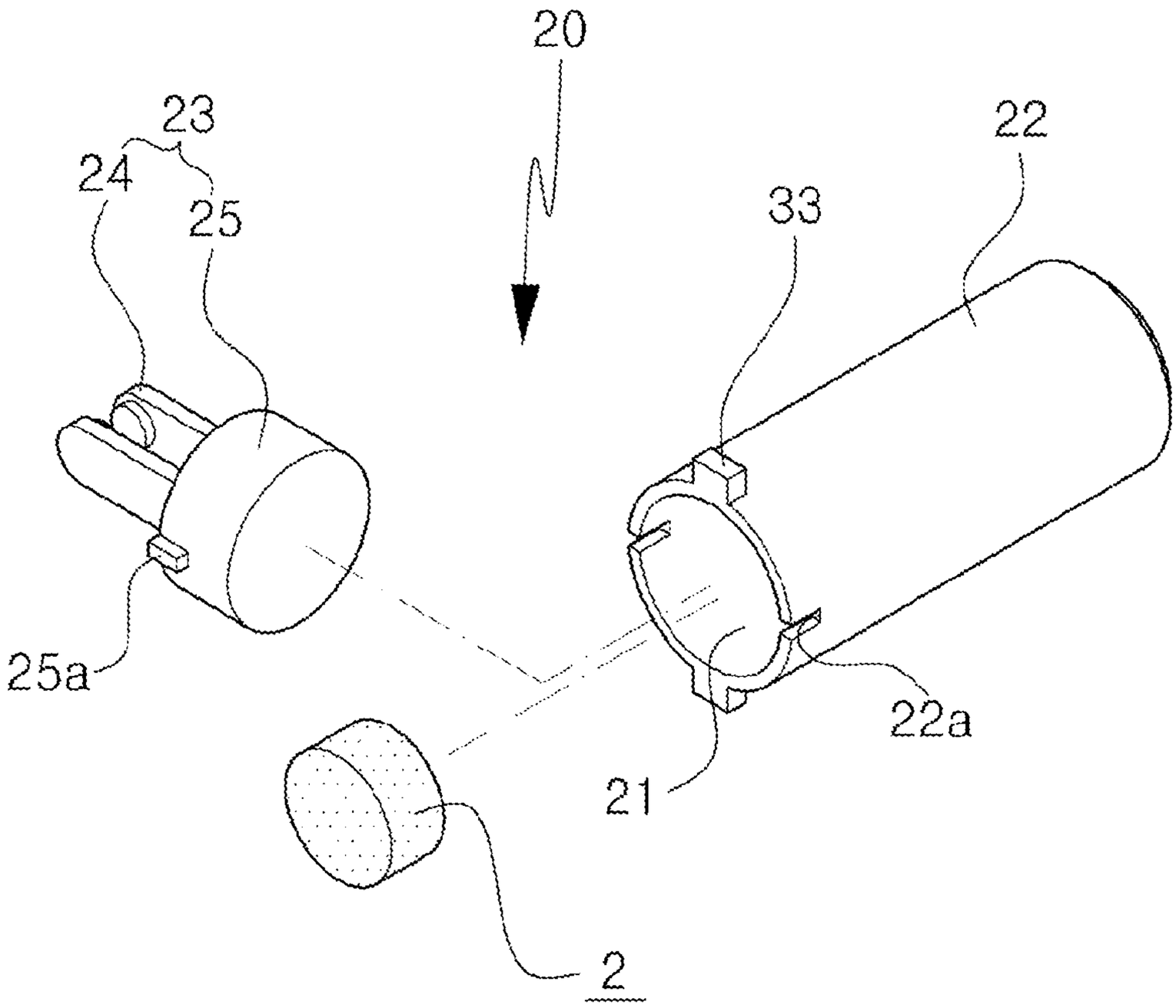
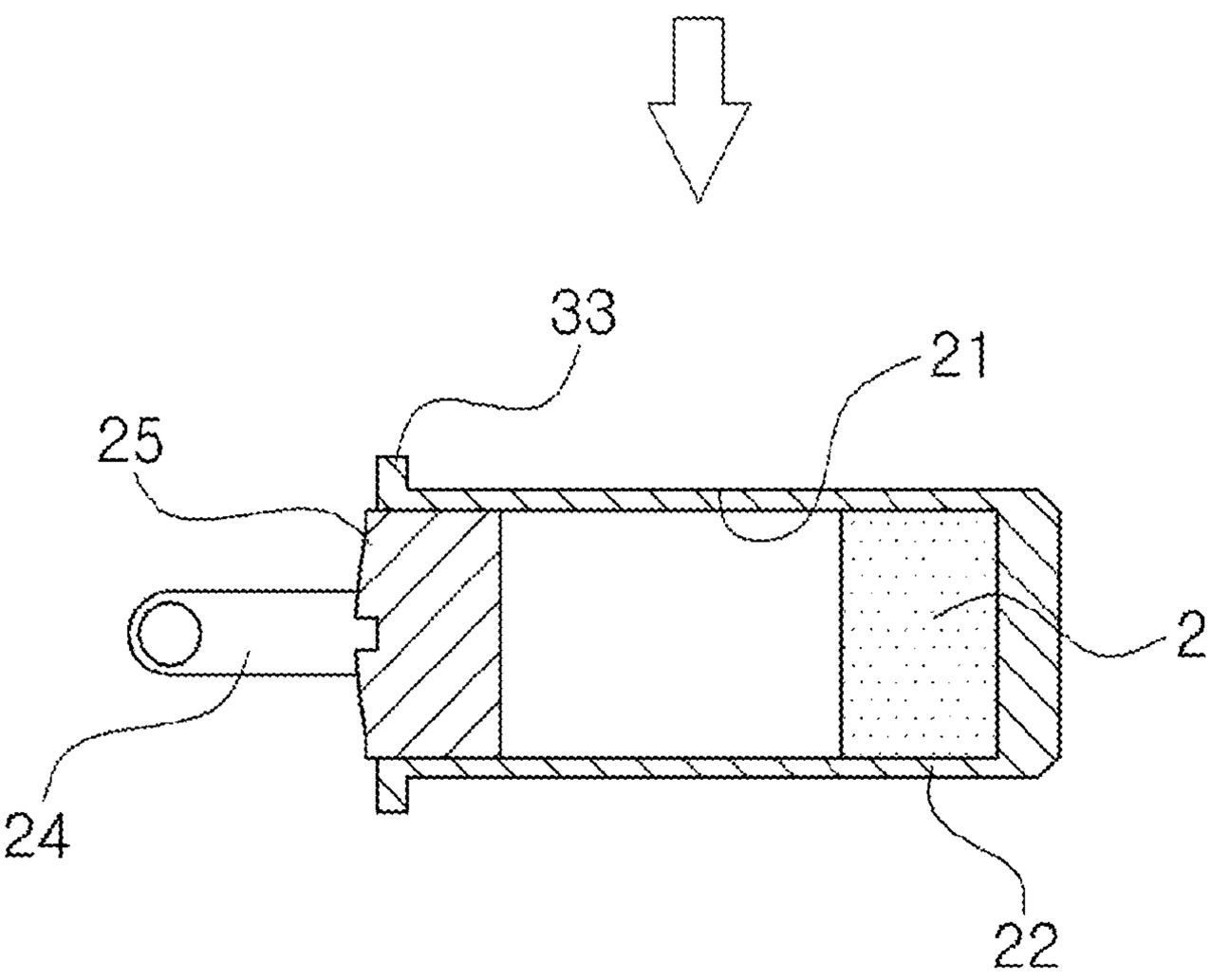
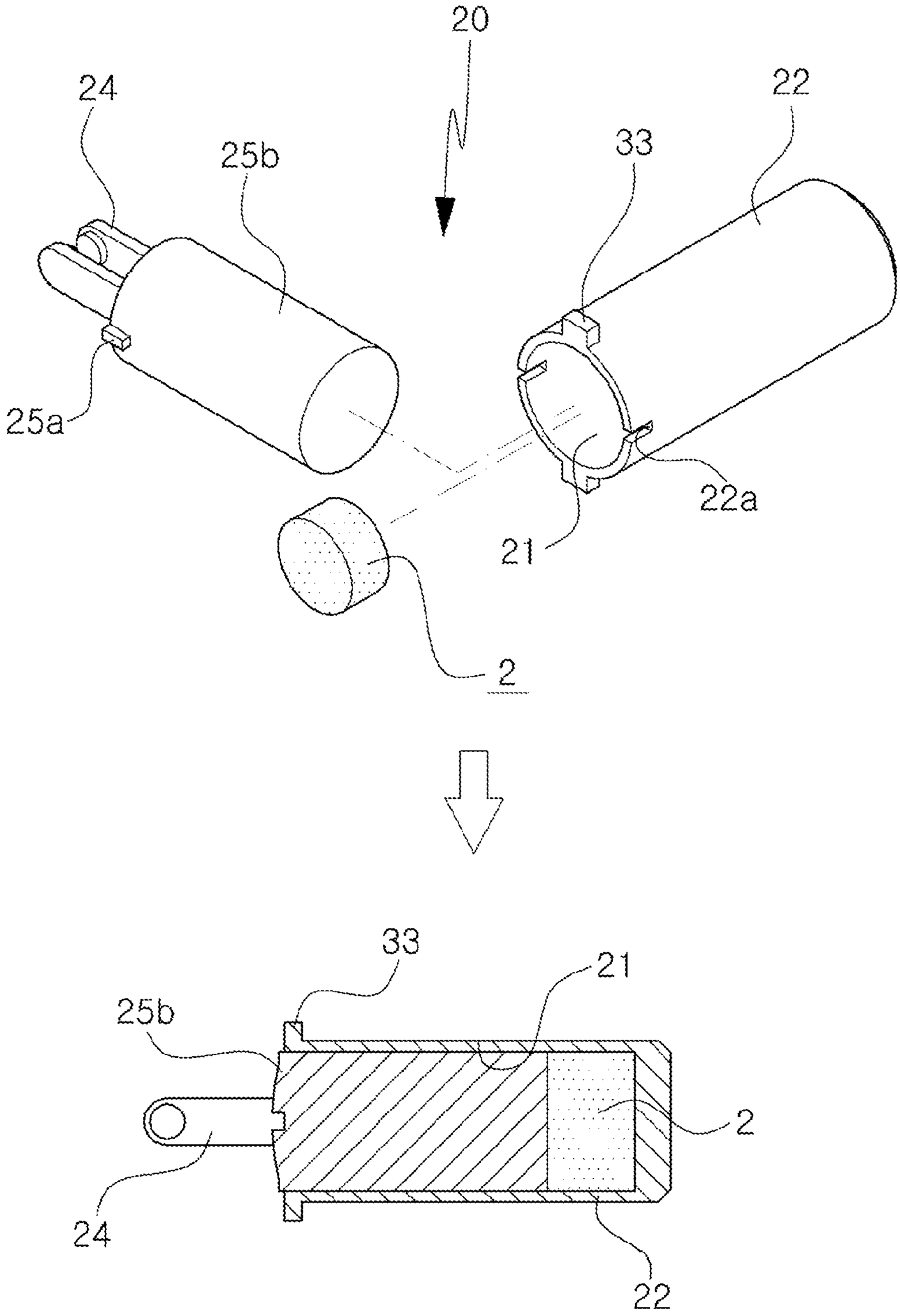
[FIG. 3]

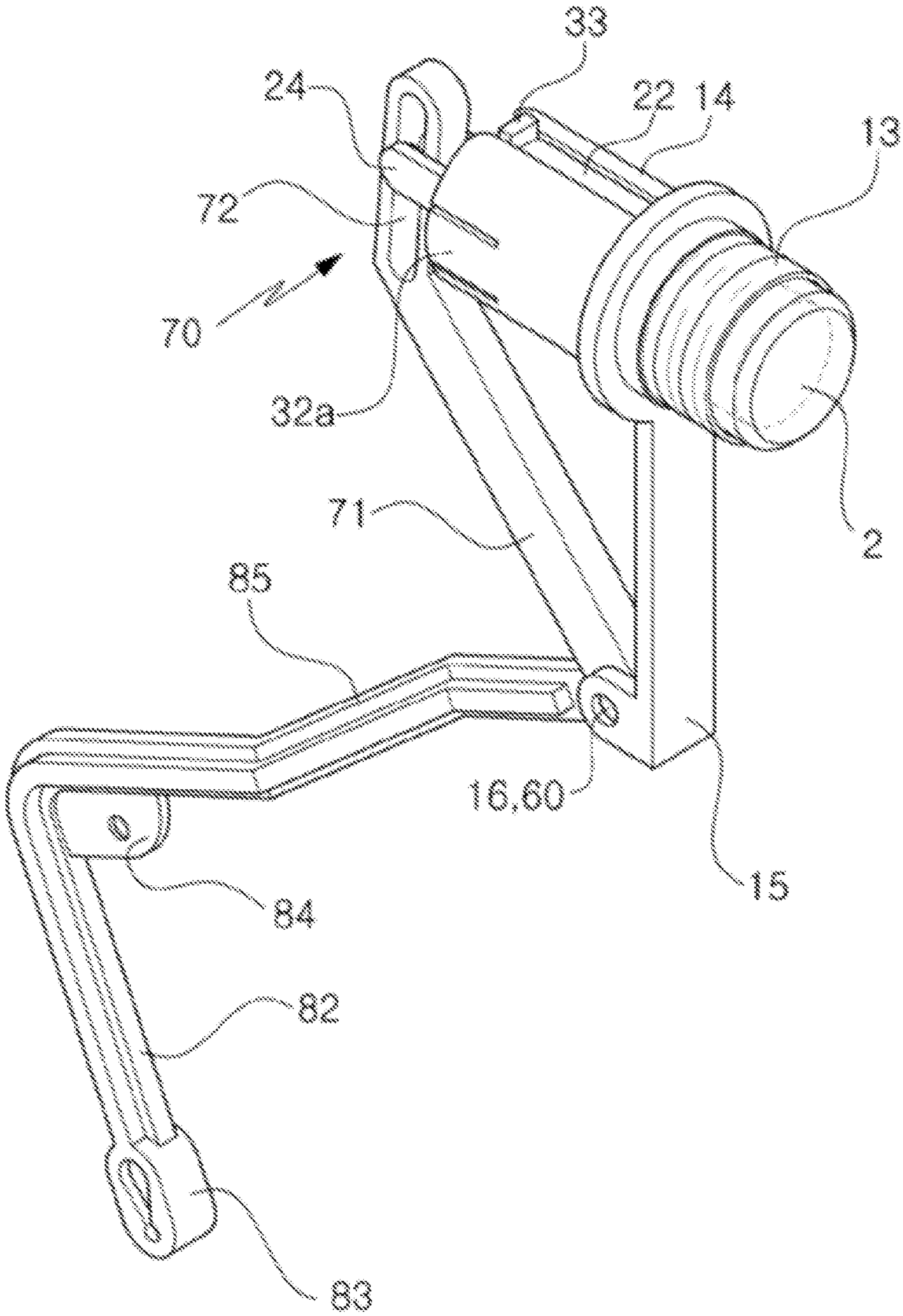




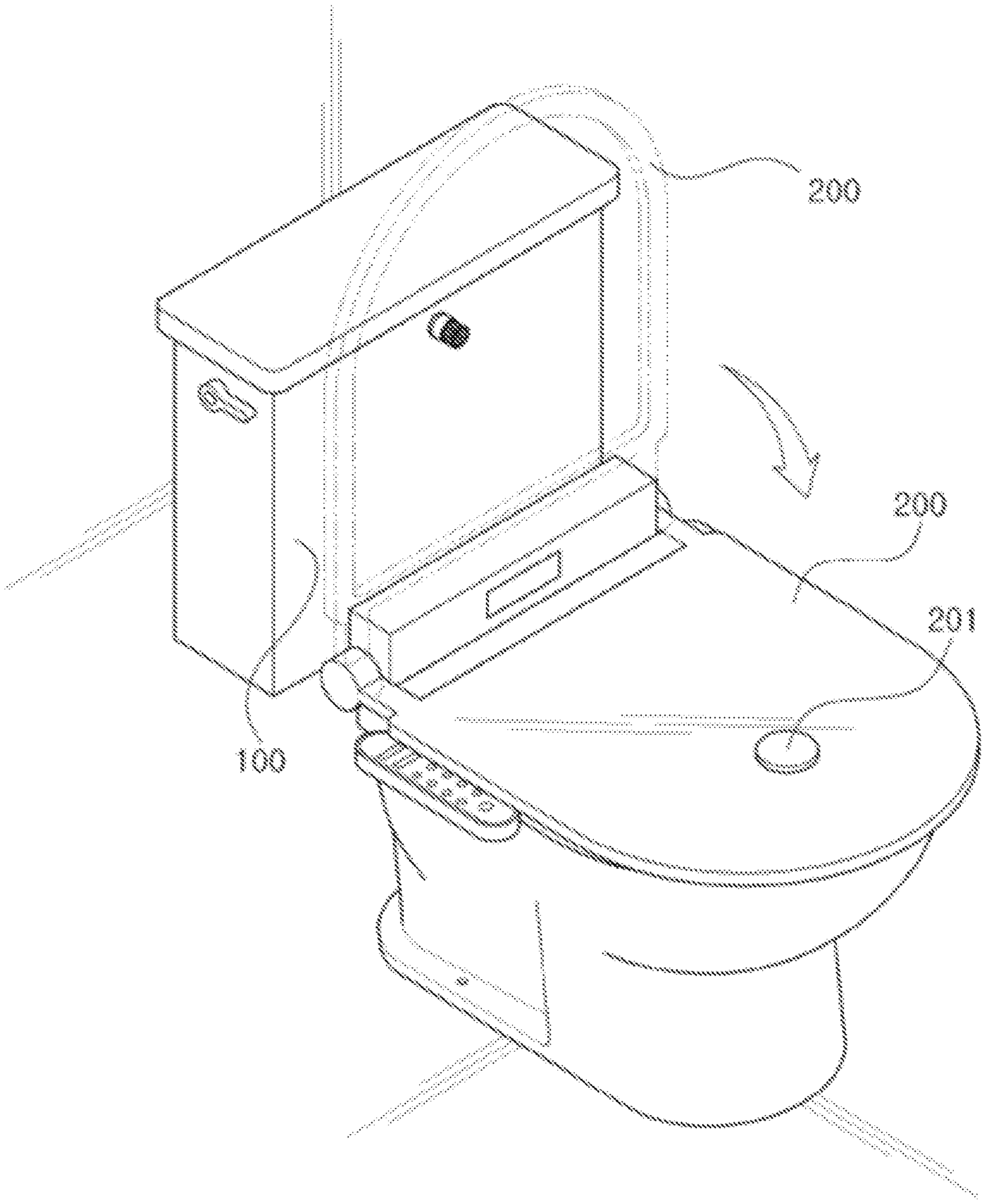
[FIG. 4]



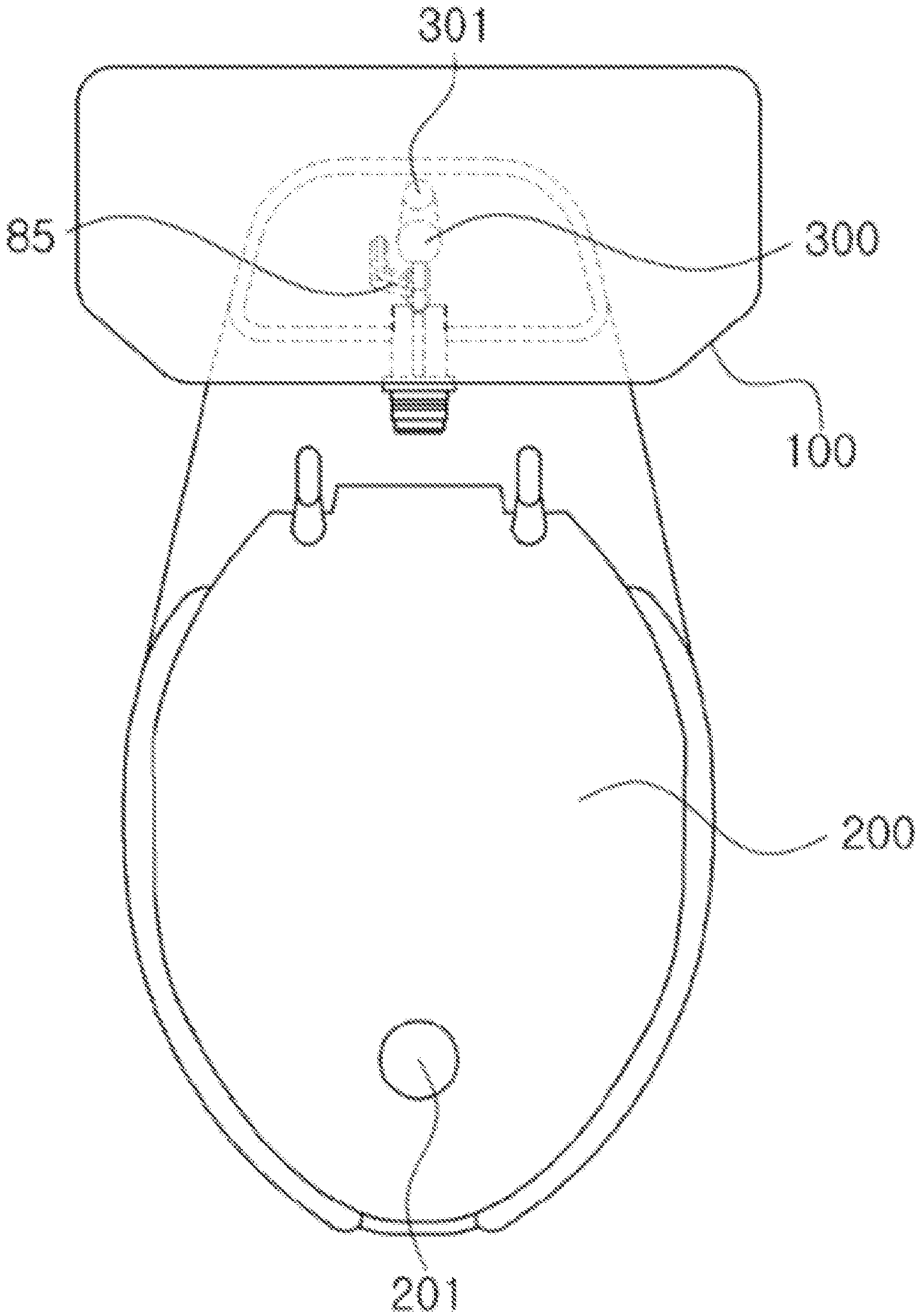
[FIG. 5]



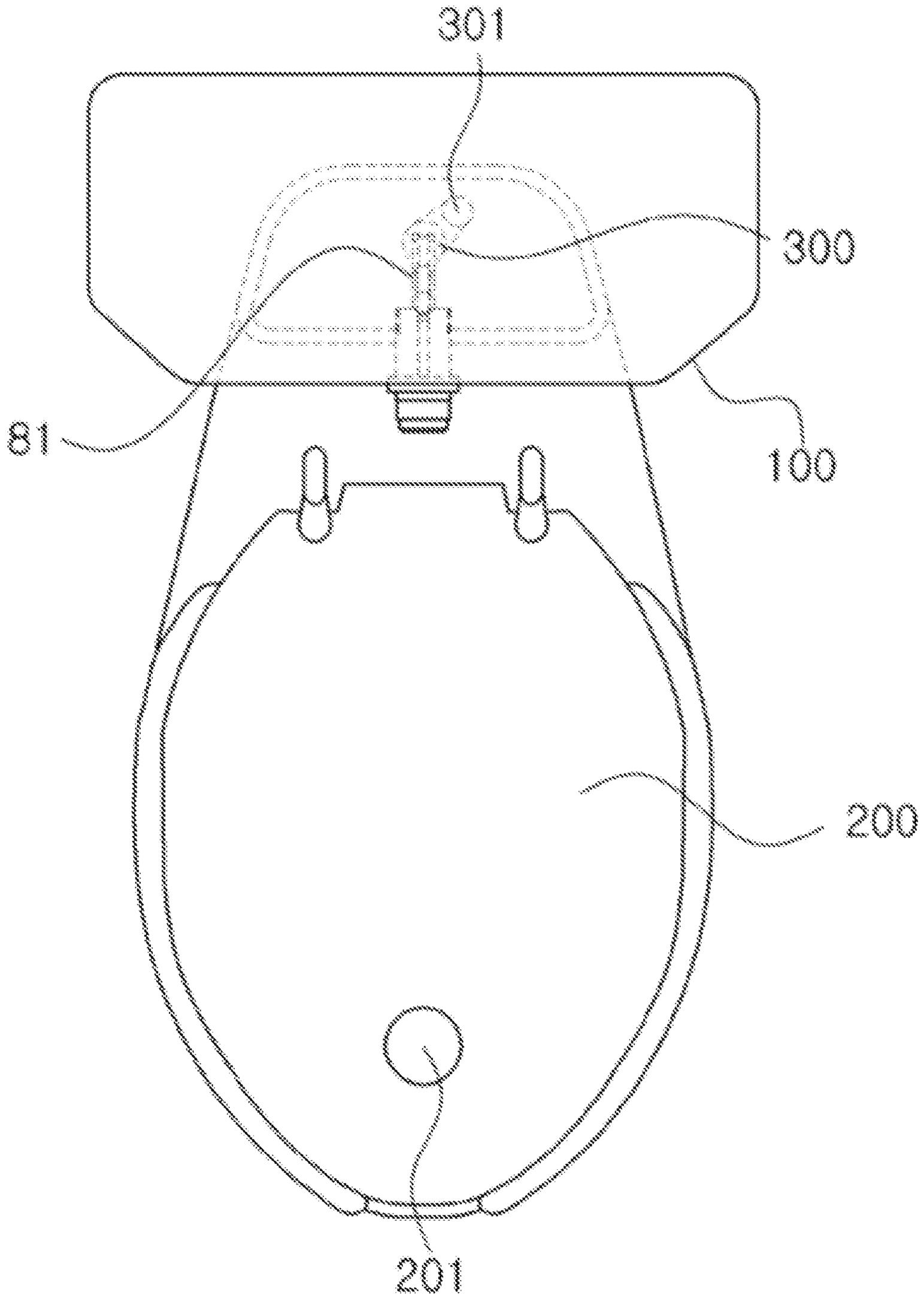
[FIG. 6]



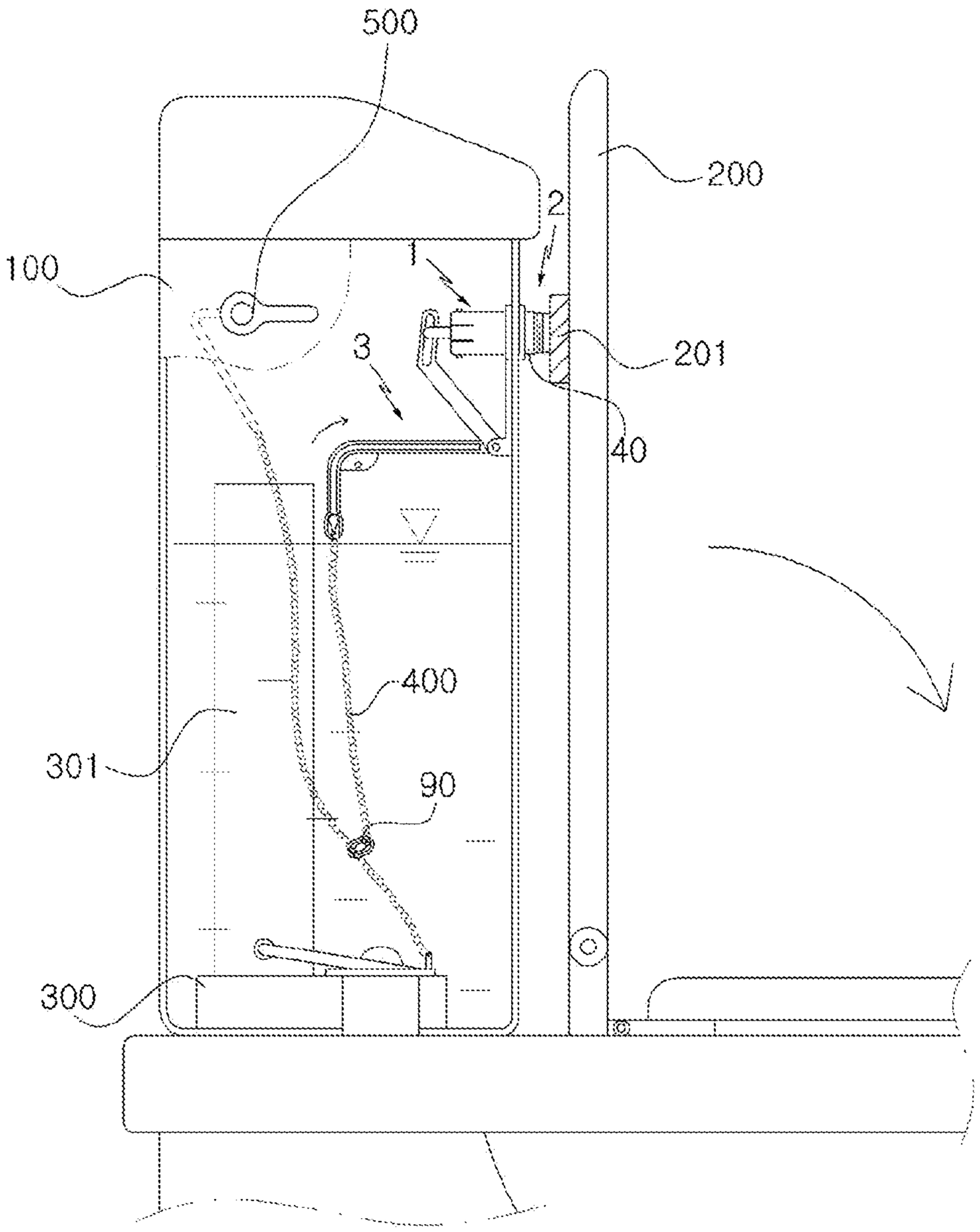
[FIG. 7]



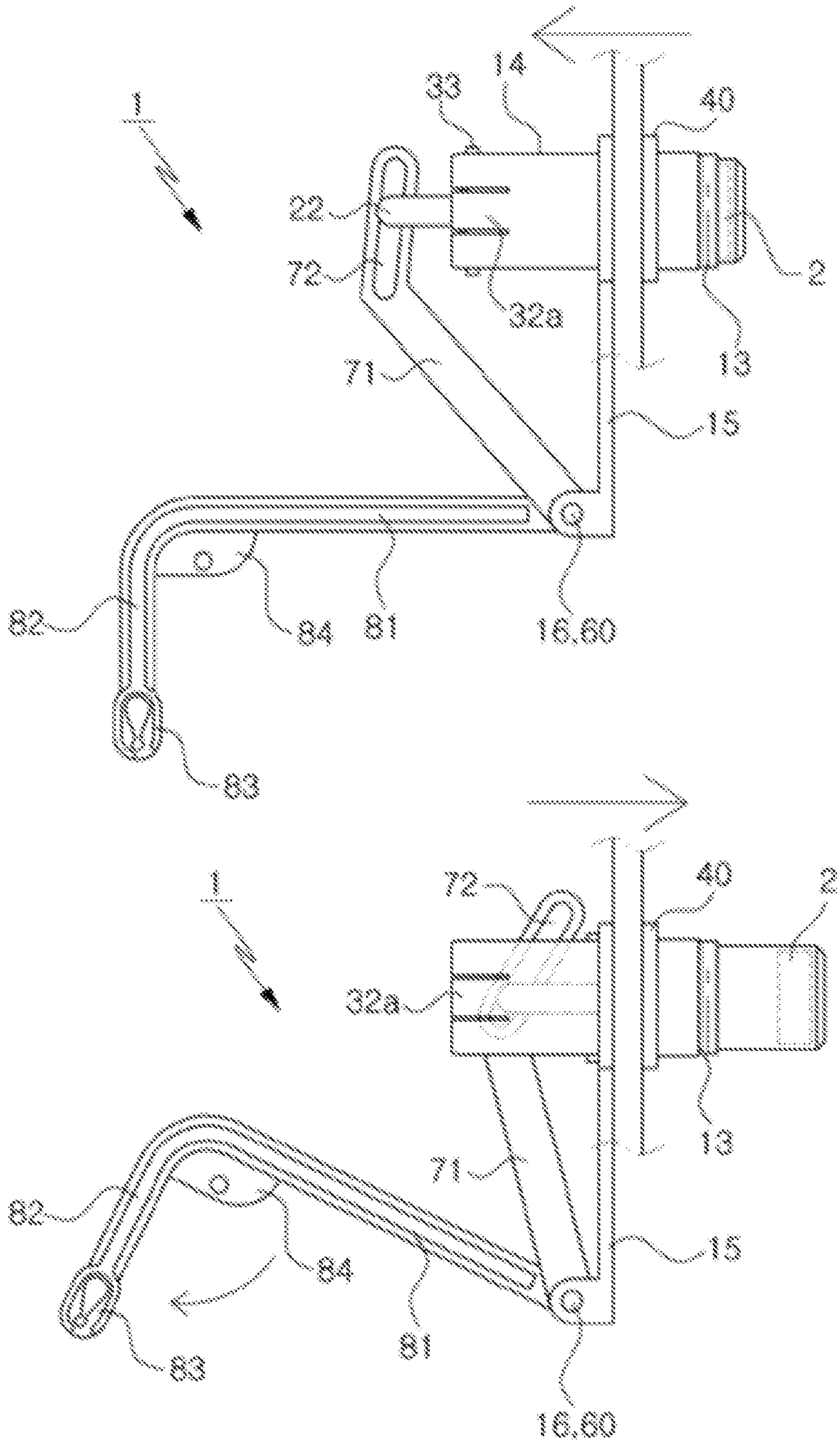
[FIG. 8]



[FIG. 9]



[FIG. 10]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TOILET FLUSHING DEVICE USING TOILET COVER

FIELD OF INVENTION

The present invention relates to a toilet flush device using a toilet lid that operates a drain valve while closing a toilet seat at the same time, in order to flush water after use by means of the toilet lid, and therefore, to induce a habit of closing the toilet seat with the toilet lid after defecating, thereby improving hygienic toilet management.

BACKGROUND OF INVENTION

In general, a toilet bowl installed in a bathroom of a house or a public place has a structure in which excreta are discharged to a septic tank while the washing water is drained by pressing a button or a lever after use. The drain valve for draining the washing water stored in a water tank of the toilet is typically a button-type or lever-type structure directly operated by a user.

However, in the prior art, a toilet is commonly flushed without putting a toilet lid down. As a result, during aeration of the washing water, there is a problem that harmful bacteria are spread to the air outside the toilet bowl and then in the air. Accordingly, the inside of a toilet stall is contaminated with the harmful bacteria, hence threatening the user's health and causing sanitation problems.

In order to solve such problems, a technique for leading the toilet seat to be closed with the toilet lid in conjunction with operation of the drain valve after use has been disclosed.

According to a drain valve switching device for a toilet bowl using magnetic force disclosed in Korean Patent No. 10-1621906 (prior document 1), the drain valve switching device is based on a technique characterized in that a drain valve for switching (opening/closing) a drain port inside a water tank is connected to a drive line and, when the drive line is pulled, the drain port is opened to drain water, and comprises: a connection member for guiding the drive line connected to the drain valve to be drawn in and out; a weight body coupled to the drive line in the water tank, which has a predetermined weight; a close contact member which is formed to be connected to the drive line through the connection member and is exposed to the outside of the water tank; and a fixing member formed and fixed at a predetermined position of the toilet lid in order to correspond to the contact member, wherein the contact member and the fixing member are made of magnetic bodies, in particular, at least one of the contact member and the fixing member is made of a magnet, and the contact member and the fixing member are configured to be attached to or detached from each other by opening and closing the toilet lid, thus enabling the toilet lid to be closed by a user after use.

However, the above prior document 1 has a problem in that the drain valve is not smoothly switched and has deteriorated durability, since the drive line is connected to be bent at 90 degrees to the connection member in a structure in which the drive line connecting the drain valve and the magnetic body is connected by the weight body.

According to an automatic toilet flush device disclosed in Korean Patent No. 10-1785037 (prior document 2), the flush device to flow washing water stored in a water tank after defecating comprises: a coupling member mounted on the front of the water tank; a pole button for actuating an operation lever while moving back and forth inside the coupling member; and a pulling means mounted on a toilet lid to pull the pole button, and is based on a technique characterized in that water flows upon closing the toilet lid, which in turn leads to a simple configuration and structure with high durability and promotes a habit of closing the toilet lid, thereby achieving enhanced hygiene and cleanliness of the toilet.

The prior document 2 has proposed a technique known by the present inventors, and disclosed a combined structure of: the pole button sliding by magnetic force; a horizontal link; and a rotatable link that enables simultaneous switching motion of the toilet lid and a siphon stopper, thereby inducing the toilet lid to be closed. However, the sliding pole button structure has somewhat deteriorated durability and a configuration of the operation lever with the horizontal link and the rotatable link has a disadvantage of somewhat cumbersome manufacture and assembly.

SUMMARY OF INVENTION

Technical Problem to be Solved

Therefore, the present invention has been devised as a novel technical art to overcome the aforementioned problems of the prior art, and an object of the present invention is to provide a toilet flush device using a toilet lid, characterized in that, in order to achieve a toilet culture to guide a toilet seat to be closed after use, switching a drain valve is operated in conjunction with a toilet lid, and a simple and convenient assembly structure of the sliding means to slide by magnetic force as well as a configuration of not deteriorating durability are adopted, thereby improving user convenience and hygienic management of the toilet.

Technical Solution

In order to solve the above problems, the toilet flush device of the present invention is provided with a specific means, that is, a sliding means, including: a slide guide member in which an insert screwed with a fastening nut protrudes from a front end of a locking flange in order to be coupled while penetrating the inside/outside of a water tank, a slide guide pipe protrudes from a rear end of the locking flange, and a hinge support having a hinge groove at a lower end thereof is formed on a lower part of the locking flange; a sliding pole in which a magnetic body detachably adhered to a corresponding attachment member of a toilet lid is inserted into a front side of the sliding pole so as to enter the slide guide member and move back and forth, and an operation lever is hinged at a rear side of the sliding pole; and an anti-release member to prevent the sliding pole from being released from the front and rear sides of the slide guide member when the sliding pole moves back and forth.

Further, the sliding pole may include: a slide body having an insert groove opened at the rear side so that the magnetic body is inserted and coupled to an inner front end of the slide body; and a hinge member coupled to the rear side of the slide body so that the operation lever is hinged to the hinge member, wherein the hinge member has a hinge ring formed at the rear side, to which a top side of the operation lever is hinged, and a coupler is provided on the front end in order to be fitted into and coupled to the insert groove of the slide body.

Further, the anti-release member may include: a longitudinal rail hole ("rail hole") opened at a rear side thereof, which is formed on upper and lower portions of the slide guide pipe; an anti-backward release body formed at both rear ends of the slide guide pipe in order to prevent back-

ward release of the sliding pole; and a slider projection formed at the rear upper and lower sides of the sliding pole to be inserted into the rail hole and guided, so as to prevent forward release of the sliding pole while supporting straight movement thereof to the front and rear sides.

In addition, the anti-backward release body may include: a support piece having upper and lower incisions formed at both rear ends of the slide guide pipe; and a locking part formed to protrude inward at an end of the support piece.

Further, the operation lever may include: a seesaw type hinge member hinged to a hinge groove of the slide guide member; an upper link hinged to the rear end of the sliding pole on an upper side relative to the seesaw type hinge member in order to move back and forth; and a lower link connected to a drain valve through a connection line at the lower side in order to reciprocate up and down, thereby opening and closing the drain valve.

Further, the upper link may include: a ramp formed to incline upward from the seesaw type hinge member; and a longitudinal slide hole ("slide hole") hinged to the rear end of the sliding pole on top of the ramp in order to move back and forth along the rail hole by operating the sliding pole back and forth.

Effect of Invention

The toilet flush device using a toilet lid according to the present invention may guide the toilet seat in the closed state at all times by the toilet lid, so as to solve a problem of contaminating air in a toilet stall, in particular, to guide water flowing while covering the toilet seat, thereby attaining effects of improving cleanliness.

Further, since a simple structure of interlocking the toilet lid and the operation lever by means of a sliding means to slide by magnetic force on the front of the water tank so as to switch (that is, open and close) the drain valve is adopted, the inventive device is easily installed and applied, and may achieve excellent durability leading to effects of semi-permanent use.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is an exploded perspective view illustrating the toilet flush device using a toilet lid according to the present invention.

FIG. **2** is a combined perspective view illustrating the toilet flush device using a toilet lid according to the present invention.

FIG. **3** and FIG. **4** are perspective views illustrating in detail a configuration of the sliding pole in the configuration of the present invention.

FIG. **5** is a perspective view illustrating a modified embodiment of the operation lever in the configuration of the present invention.

FIG. **6** illustrates a state of using the toilet flush device with a toilet lid according to the present invention.

FIG. **7** and FIG. **8** illustrate installation examples of the toilet flush device according to the present invention in relation to a position of a water overflow pipe in a toilet bowl.

FIG. **9** illustrates a state of installing the toilet flush device using a toilet lid according to the present invention.

FIG. **10** illustrates operation of the toilet flush device shown in FIG. **9**.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF INVENTION

Hereinafter, the present invention will be described in detail with reference to specific embodiments in the accompanying drawings. FIG. **1** is an exploded perspective view illustrating the toilet flush device using a toilet lid according to the present invention, and FIG. **2** is a combined perspective view illustrating the toilet flush device using a toilet lid according to the present invention.

The toilet flush device using a toilet lid according to the present invention may include: a sliding means **1** formed on a front end of a water tank **100** in order to move back and forth; a magnetic body **2** provided on a front end of the sliding means **1** and detachably adhered to a corresponding attachment member **201** of a toilet lid **200**, which interlocks the toilet lid **200** and the sliding means **1** by magnetic force; and an operation lever **3** provided at a rear side of the sliding means **1** in order to switch (open and close) a drain valve **300**.

Referring to FIG. **1** and FIG. **2**, the sliding means **1** may include: a slide guide member **10** fixedly installed to penetrate a front end of the water tank **100**; a sliding pole **20** that is inserted into the slide guide member **10** and moves back and forth; and an anti-release member **30** to limit movement of the sliding pole **20**, in order to prevent the sliding pole from flowing and being released back and forth.

The slide guide member **10** may include: a slide hole **11** formed to penetrate the slide guide member; an insert **13** screwed with a fastening nut **40**, which protrudes from a front end of a locking flange **12** in order to be coupled while penetrating the inside/outside of the water tank **100**; a slide guide pipe **14** protruding at a predetermined length from a rear end of the locking flange **12**; and a hinge support **15** protruding downward to a lower side of the locking flange **12**, which has a hinge groove **16** at a lower end of the hinge support **15**.

Referring to FIG. **3**, the sliding pole **20** may be provided with a slide body **22** that is inserted into the slide hole **11** to slide back and forth and has an insert groove **21** opened at the rear side, through which the magnetic body **2** is inserted and disposed at an inner front end thereof; and a hinge part **23** coupled to the rear side of the slide body **22** so that the operation lever **3** is hinged to the hinge part.

The hinge part **23** is fitted and coupled to a rear end of the sliding pole **20**, and may include: a hinge ring **24** protruding from the rear side thereof, to which the operation lever **3** is hinged; and a coupler **25** protruding from the front side thereof, which is fitted and coupled to the insert groove **21** of the slide body **22**.

In order to prevent the hinge part **23** from being pulled out of the slide body **22** while securing a direction of the hinge ring **24** when the hinge part **23** is coupled to the rear side of the slide body **22**, the sliding pole **20** has an assembly groove **22***a* at both rear ends of the slide body **22**, and a fitting assembly **25***a* protruding from both sides of the coupler **25**.

Meanwhile, the magnetic body **2** is adhered to a front end of the insert groove **21** by an adhesive, so as to be easily secured when the magnetic body **2** is inserted into the slide body **22** of the sliding pole **20**, thereby inhibiting flow thereof.

Further, as shown in FIG. **4**, a support **25***b* may be extended at an inner front side of the slide body **22** to closely support a rear end of the magnetic body **2** by extending the coupler **25** of the hinge part **23** to easily secure the magnetic body **2**.

The support **25***b* may inhibit the magnetic body **2** from flowing in the insert groove **21** and, at the same time, may closely adhere and support the magnetic body **2** to an inner front side of the slide body **22**, thereby enabling the magnetic body to sufficiently impart magnetic force.

The anti-release member **30** may include: a longitudinal rail hole ("rail hole")(**31**,**31'**) opened at a rear side thereof, which is formed on upper and lower portions of the slide guide pipe **14**; an anti-backward release body **32** formed at both sides of the slide guide pipe in order to prevent backward release of the sliding pole **20**; and a slider projection **33** formed on rear upper and lower portions of the sliding pole **20** to be inserted into the rail hole **31**, **31'** and guided.

The anti-backward release body **32** may include: a support piece **32***a* having upper and lower incisions provided at both rear ends of the slide guide pipe **14**; and a locking part **32***b* formed to protrude inwardly at an end of the support piece **32***a*, wherein, when the sliding pole **20** is assembled to be inserted into the slide guide member **10**, the support piece **32***a* is expanded outward or retracted by a predetermined elastic restoration force and holds the sliding pole to lock the same at the rear side when the sliding pole **20** slides back and forth, thereby preventing the same from being pulled out.

The slider projection **33** may prevent forward release of the sliding pole **20** from the slide guide pipe **14** and, at the same time, may be integrated with upper and lower edges at the rear side of the slide body **20**, thus guiding straight reciprocation of the sliding pole without flowing.

The magnetic body **2** is integrally formed while being inserted into the inner front end of the sliding pole **20** to act with a retraction force when closing the toilet lid **200**, whereby the sliding pole **20** is interlocked by magnetic force.

Further, in order to attach the magnetic body **2** to the toilet lid **200**, a corresponding attachment member **201** is installed on the toilet lid **200** to be detachable in response to the magnetic body **2**. In order to improve adhesion, the attachment member **201** may be configured to be proportional to a diameter of the magnetic body **2**. Further, the attachment member **201** may be provided in the form protruding or embedded in the toilet lid **200**.

The operation lever **3** may be configured to connect the sliding pole **20** and the drain valve **300** such that the drain valve **300** of the water tank is interlocked with forward or backward movement of the sliding pole **20** by the magnetic body **2** pulled due to the magnetic force when the toilet lid **200** is closed.

To this end, the operation lever **3** may include: a seesaw type hinge member **60** hinged to the hinge groove **16** of the hinge support **15**; an upper link **70** connected to the hinge part **23** at the rear end of the sliding pole **20** on an upper side relative to the seesaw type hinge member **60**; and a lower link **80** connected to the drain valve **300** at a lower side through a connection line **400**.

The upper link may include a ramp **71** formed to incline upward from the seesaw type hinge member **60**, and a longitudinal slide hole ("slide hole") **72** perpendicular to a top end of the ramp **71**.

The lower link **80** may include: a horizontal stand **81** protruding in a horizontal direction from the seesaw type hinge member **60**; a vertical stand **82** bent vertically downward from the horizontal stand **81**; a coupling hole **83** to which the connection line **400** is coupled in order to connect the drain valve **300** to a bottom end of the vertical stand **82**; and a reinforcing rib **84** for supporting rigidity between the horizontal stand **81** and the bent vertical stand **82**.

In the operation lever **3** as described above, the upper link **70** is hinged to the sliding pole **20** to reciprocate the lower link **80** up and down while moving back and forth simultaneously, thereby switching the drain valve **300**, wherein the hinge support **15** and the seesaw type hinge member **60** support reciprocal action in a principle of lever motion between the upper link **70** and the lower link **80**, thereby leading to smooth switching operation.

Meanwhile, as shown in FIG. **5**, the lower link **80** of the operation lever **3** may be modified to have a structure wherein a horizontal ramp **85** having an inclined angle in planar view from the seesaw type hinge member **60** is provided in place of the horizontal stand **81**, so as to avoid interference depending upon a position of a water overflow pipe **301** during reciprocation, and the vertical stand **82** is bent vertically downward from the horizontal ramp **85**.

Hereinafter, operation of the toilet flush device using a toilet lid according to the present invention will be described.

FIG. **6** illustrates a state of using the present invention, wherein the toilet flush device of the present invention is interlocked with motions of opening and closing a toilet lid **200** to flow water, when the inventive device is mounted to penetrate a front center of the water tank **100**. In other words, when the toilet lid **200** is flipped toward the water tank **100**, the attachment member **201** previously mounted on the toilet lid **200** is adhered to the magnetic body **2** due to magnetic force. Then, when flipping down the toilet lid **200** again to close the same after use, the toilet flush device is simultaneously operated to flow water. Accordingly, a user naturally recognizes that the toilet flush device is interlocked with closing the toilet lid **200**, thereby guiding the toilet seat to be closed by the toilet lid whenever the toilet is flushed or not in use.

Referring to FIG. **7** and FIG. **8**, when the toilet flush device of the present invention is mounted on the water tank **100**, this device can afford smooth operation by avoiding interference of the operation lever **3** depending on a position of the water overflow pipe **301**.

In other words, FIG. **7** illustrates use of the lower link **80** of the operation lever **3**, which is configured of a straight horizontal stand **81**, in case of a structure wherein the water overflow pipe **301** is disposed in a diagonal direction. On the other hand, FIG. **8** illustrates use of the lower link **80** of the operation lever **3**, which is configured of a horizontal ramp **84** having an inclined angle, in case of an alternative structure wherein the water overflow pipe **301** is disposed at the center.

FIG. **9** and FIG. **10** illustrate a specific operation state of the toilet flush device of the present invention, wherein the sliding means **1** is installed to penetrate the inside and outside of the water tank **100**, and includes: a sliding pole **20** to linearly reciprocate back and forth inside the slide guide member **10**; and the operation lever **3** hinged at the rear side of the sliding pole **20** and connected through a connection line **400** in order to switch the drain valve **300**. Further, upon opening and closing the toilet lid **200**, the sliding pole **200** is reciprocated by magnetic force of the magnetic body **2** and, at the same time, the drain valve **200** is switched by the operation lever **3**.

In order to flow water, the toilet is used by a user in a state in which the toilet lid **200** is attached to the magnetic body **2** and, when the toilet lid **200** is pulled to a toilet seat after use in order to close the toilet seat, the sliding pole **20** attached by magnetic force of the magnetic body **2** slides forward along the toilet lid **200** due to pulling force. Simultaneously, the operation lever **3** hinged to a rear end of the sliding pole **20** acts such that the upper link **70** moves forth along the sliding pole **20** relative to the seesaw type hinge member **60** while the lower link **80** on a lower side of the seesaw type hinge member **60** is lifted and reciprocates, simultaneously, so as to lift the drain valve **300** connected through the connection line **400**, thus flowing water.

Then, after the drainage process, the drain valve **300** naturally returns to the closed state, the lower link **80** moves downward, and the sliding pole **20** moves back and is returned to an original state thereof.

In this regard, because of a structure in which the upper link **70** is hinged to the hinge part **23** of the sliding pole **20** through the slide hole **72**, the slide hole **72** may naturally move forth along the rail hole **31**,**31'** of the slide guide pipe **14** upon forward movement of the sliding pole **20**. For the operation lever **3**, the seesaw type hinge member **60** acts in the principle of lever motion to smoothly reciprocate the lower link **80** up and down, thus overcoming a problem of deteriorating durability such as breaking of the operation lever **3** or the like.

Further, for operation of the sliding pole **20**, the sliding pole moves back and forth in a configuration of the slider projection **33** inserted into the rail hole **31**, **31'**. Further, due to action of the anti-release member **30** consisting of the anti-backward release body **32** at a rear end of the slide guide pipe **14**, the sliding pole may conduct straight movement without flowing and stably slide without being released back and forth within a limited distance of the rail hole **31**, **31'**, thereby smoothly switching the drain valve **300**.

On the other hand, the toilet flush device of the present invention may be used simultaneously with the existing water flowing lever **500** when the inventive device is installed in a toilet bowl. Herein, if the connection line **400** is connected to the lower link **80**, an interlocking ring **90** may be simply fastened to the connection line **400** that connects the existing water flowing lever **500** and the drain valve **300**, thereby completing installation.

As such, the toilet flush device using a toilet lid according to the invention as described above has a simple structure to achieve easy and convenient assembly. Further, a stable structure and action in conjunction with the toilet lid are provided so as to enable semi-permanent use. Especially, when the toilet bowl is not in use, the inventive device may lead the toilet seat to be always closed by the toilet lid. Therefore, it is possible to prevent bacteria propagation in a toilet stall due to the toilet bowl while further enhancing cleanliness of the toilet stall.

As described above, the detailed description of the present invention has been concretely illustrated with respect to the most preferred embodiment of the preset invention. However, various modifications may be made within the range not departing from the technical scope of the present invention. Therefore, the protected scope of the present invention is not limited to the examples described above and, instead, it will be recognized that technologies in the appended claims below and equivalent technical means thereof are also included in the scope of the present invention.

INDUSTRIAL APPLICABILITY

The present invention enables the drain valve to be operated upon closing the toilet seat with the toilet lid so that water can flow using the toilet lid after use. Further, a habit of closing the toilet seat with the toilet lid is induced to create a clean and hygienic toilet culture, thereby attaining very high industrial availability.

The invention claimed is:

1. A toilet flush device using a toilet lid, which includes a sliding means, comprising:

a slide guide member in which:

an insert screwed with a fastening nut protrudes from a front end of a locking flange in order to be coupled while penetrating a inside/outside of a water tank,

a slide guide pipe protrudes from a rear end of the locking flange, and

a hinge support having a hinge groove at a lower end thereof is formed on a lower part of the locking flange;

a sliding pole in which:

a magnetic body magnetically attaches and detaches from a corresponding attachment member of a toilet lid is inserted into a front side of the sliding pole so as to enter the slide guide member and move back and forth, and

an operation lever is hinged at a rear side of the sliding pole; and

an anti-release member formed to prevent the sliding pole from being released from a front and rear sides of the slide guide member when the sliding pole moves back and forth.

2. The device according to claim **1**, wherein the sliding pole includes:

a slide body having an insert groove opened at a rear side so that the magnetic body is inserted and coupled to an inner front end of the slide body; and

a hinge member coupled to a rear side of the slide body so that the operation lever is hinged to the hinge member, wherein the hinge member has a hinge ring formed at a rear side of the hinge member, to which a top side of the operation lever is hinged, and a coupler provided on the front end of the hinge member in order to be fitted into and coupled to the insert groove of the slide body.

3. The device according to claim **1**, wherein the anti-release member includes:

a longitudinal rail hole opened at a rear side thereof, which is formed on upper and lower ends of the slide guide pipe;

an anti-backward release body formed at opposite rear ends of the slide guide pipe in order to prevent backward release of the sliding pole; and

a slider projection formed at a rear upper and lower sides of the sliding pole to be inserted into the rail hole and guided, so as to prevent forward release of the sliding pole while supporting straight movement thereof to an front and rear sides of the sliding pole.

4. The device according to claim **3**, wherein the anti-backward release body includes:

a support piece having upper and lower incisions formed at opposite rear ends of the slide guide pipe; and

a locking part formed to protrude inward at an end of the support piece.

5. The device according to claim **3**, wherein the operation lever includes:

a seesaw type hinge member hinged to the hinge groove of the slide guide member;

an upper link hinged to the rear end of the sliding pole on an upper side relative to the seesaw type hinge member in order to move back and forth; and

a lower link connected to a drain valve at a lower side of the lower link through a connection line in order to reciprocate up and down, thereby opening and closing the drain valve.

6. The device according to claim **5**, wherein the upper link includes:

a ramp formed to incline upward from the seesaw type hinge member; and

a longitudinal slide hole hinged to a rear end of the sliding pole on top of the ramp in order to move back and forth along the rail hole by operating the sliding pole back and forth.

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